

ACHIEVEMENT VIA PROGRAMED INSTRUCTION AND SOCIOECONOMIC STATUS¹

AUDREY HERR AND SIGMUND TOBIAS²

City College, City University of New York

There is much in the current literature to underscore the growing concern with the education of the poor. Investigators with a variety of disciplines have offered hypotheses and suggested strategies designed to increase learning in the ghetto schools. One approach to this problem which has been advanced repeatedly by investigators with quite diverse orientations towards learning is that of programed instruction. The fact that programed materials are highly structured, offer immediate feedback, no time pressure, and a high probability of success are among the many arguments advanced in favor of their suitability for pupils from low socioeconomic (SES) backgrounds.

According to Ausubel (1965) the culturally deprived child's style of learning is characterized by "responding to the more concrete, tangible, immediate and particularized properties of objects and situations rather than to their abstract, categorical, and relational properties [p. 11]." This concrete cognitive style, when combined with a school curriculum that is too demanding of him, serves to alienate the lower-class child from the school (Deutsch, 1963).

Ausubel developed a number of criteria for the selection of an instructional strategy that would be most effective in arresting and reversing scholastic deficits among low SES pupils. First, the initial learning material should be geared to the learner's existing state of readiness. Second, ongoing learning tasks should be mastered prior to the introduction of new tasks, to assure a foundation for successful sequential learning and to prevent lack of readiness for future learning tasks. And finally, the learning materials should be highly structured and optimally organized to facilitate efficient sequential learning. In his opinion "of all the available teaching strategies, programed instruction . . . has the greatest potentialities for meeting the aforementioned three criteria of an effective and appropriate approach to the teaching of culturally deprived pupils [Ausubel, 1966, p. 468]." Programed instruction, he continues, is "especially" suitable to meeting the learning needs of low SES children when adaptations to their readiness levels are made. Ausubel anticipates that by experiencing effective learning for the first time the disadvantaged student will develop confidence in his ability to learn, and restore his "educational morale."

Klinger (1968) goes a step further and suggests that for disadvantaged pupils, programed instruction has the meaning of a self-fulfilling prophecy of success. It is a private experience for the learner: no one is looking on to humiliate him should he make an error, or work at a slower pace than some of his classmates. This, he feels, not only increases the child's knowledge of the subject matter, but helps the child to develop socially acceptable behavior since his defensive tactic of flight from the classroom becomes unnecessary.

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²The second author was a U. S. Office of Education Fellow in Educational Research at the Learning, Research & Development Center, University of Pittsburgh, when this report was prepared.

Gotkin (1967) has used programed instruction to teach language skills to preschool disadvantaged children. In addition to the previously mentioned feature of programed materials, he considers them especially important in the ghetto school because of their provision for individualized instruction. He believes individualized instruction to be especially necessary to provide continuity in the face of high pupil mobility, poor attendance, and the diminished instructional time in ghetto schools caused by the high rate of teacher turnover (Cloward & Jones, 1963).

Filep (1967) suggested that the learning patterns of culturally deprived youngsters be matched with the media most suited for their education. His study investigated the effectiveness of three visual stimulus modes (verbal, graphic, and motion) and three audio stimulus modes (redundant, directive, and no sound) presented via machine mediated programed instruction (linear or branching) in instructing 1400 eighth-grade students from four junior high schools. Measures of intelligence and achievement, as well as SES factors (ethnic group and parent's occupation) were considered as indicators of the child's predominant learning style. A multiple regression analysis indicated that the non-white, low IQ, low SES group learned most from the nonverbal, sound, branching treatments.

It seems clear from the preceding that a number of investigators endorse the idea that programed instruction is especially beneficial for disadvantaged students. Implicit in these comments is an assumption that the characteristics of programed materials and of disadvantaged students match one another uniquely. The question is then raised whether the presumed superiority of programed materials for low SES pupils is to be attributed to factors other than their reduced scholastic achievement. Specifically, is there something about the milieu, the background, and cognitive development of low SES pupils which makes programed materials especially advantageous for members of disadvantaged groups above what one would expect from their academic retardation? The purpose of the present report was to investigate this question.

METHOD

The data for this report were taken from the New York City Board of Education Programed Instruction Project (Fanning, 1967).³ The project involves a total of 33 special service and non-special service schools and almost 4000 pupils, from all sections of the city. The effectiveness of a variety of commercially produced instructional materials was investigated in this project. Nine classes, 5 from low SES areas, and 4 from middle SES were drawn from this subject pool. The available data on these Ss, in addition to identifying information, included reading scores, time taken on the program, and pre- and posttest scores on the program content. These latter scores constituted the dependent measures for this report.

Materials

The program utilized in this study, *Longitude and Latitude* (Haring, 1962) had been used by the Board's Programed Instruction Project for four years. The program is in the linear mode, and designed to teach a specific skill: the ability to find, read, write, and identify locations from a globe or simple map. Although intended for use with sixth-grade classes Ripple and O'Reilly (1966) have suggested that the program has a fifth-grade (5.0) reading level. The program booklet is constructed with a built-in slider which conceals answers to a frame until pulled down by the pupil upon completion of the frame on which he is working.

In order to be considered effective by the Board of Education a program had to yield a gain in achievement, from pre- to posttest, of 50%. The *Longitude and Latitude* program had satisfied these criteria.

³The cooperation of Robert Fanning, Director, Programed Instruction Project, New York City Board of Education in making the data and materials available, is gratefully acknowledged.

Subjects and Procedures

A total of 220 students served as the Ss in this study. They were drawn from 9 classes in 9 schools in the City of New York. The socioeconomic level of the pupils was assigned on the basis of the type of school the pupils attended. Low SES subjects came from 5 special service schools in poverty areas, and middle class Ss were drawn from 4 non-special service schools in areas designated as middle class. The special service classification was assigned to a school, by the Board of Education, on the basis of a number of criteria, including a large percentage of pupils receiving free lunch and a high rate of pupil mobility. The mean age for the sample was 11 years, 1 month and included 113 boys and 107 girls; 197 pupils came from the fifth grade, and 23 from the sixth.

The programs were administered to pupils in the schools, as part of the regular curriculum. Students made their responses to the program on numbered sheets of lined paper. Prior to taking the program, and after its completion, a mimeographed test covering the content taught by the program was administered. The test was the final "Review Set 10" of the program, consisting of 44 fill-in items. The teachers recorded the pupils' scores, as well as the total time taken by the pupil to complete the program.

RESULTS AND DISCUSSION

The data were submitted to a multiple regression analysis. Socioeconomic level by itself accounted for only 2.6% of the variance, giving rise to an F of 5.55, which was significant at the .02 level. However, reading alone correlated .55 and pretest correlated .57 with posttest achievement scores. The multiple correlation of both of these variables with posttest was .66.⁴

Once differences between the SES groups in reading ability were held constant, the amount of achievement variance accounted for by SES level dropped to zero. Needless to say the F test was not significant. This analysis demonstrated that the small amount of achievement variance accounted for by SES level was entirely a function of the SES differences in reading ability. Although prior knowledge of the subject matter, as indicated by the pretest score, did have a high correlation with posttest scores, it did not differentiate between SES groups.

The results offer no support for the idea that programed materials are especially advantageous for disadvantaged youngsters above and beyond what would be expected on the basis of their academic level. It was clear from the data in this study that the differentiating variable in determining the amount a pupil gains from a program was not SES background, but reading level. The fact that the mean gain scores for the two groups are quite similar (11.8 for middle, 11.0 for low) only re-emphasizes this point (see footnote 4).

It seems possible that the results of this study could be attributed to a number of extraneous factors. According to the Board of Education, the minimum reading level required to work the program was fourth grade, while Ripple and O'Reilly (1966) suggested that a fifth-grade reading level was required. Since the mean reading level for the present sample, expressed in terms of grade equivalence, was 5.4 (4.8 for the low SES pupils) the vocabulary of the program may have been too difficult for some of the low SES pupils. On the other hand, both groups gained from the program, and the amount of gain was not correlated with SES level ($r_{pt. bis} = .03$). This finding indicated that SES differences in reading level did not work to the detriment of the low SES group with respect to achievement gain from the program. A suggestion emerging from this research would be to determine the minimum reading level required by particular programs more carefully, and, when necessary, adapt them to the readiness level of the students. For as Singer

⁴Supplementary tabular material may be obtained by ordering NAPS Document 00388 from ASIS National Auxiliary Publications Service, c/o CCM Information Sciences, Inc., 22 West 34th Street, New York, N. Y. 10001; remitting \$1.00 for microfiche or \$3.00 for photocopies.

(1968) claims, the generally inappropriate and "unimaginative use of programed materials in ghetto schools is a waste of potentially useful instructional tool [p. 862]."

It also seems possible that the classification of SES level used in this study may have led to these results. A child's classification was not determined individually, but rather by the type of school attended. This may have led to the incorrect classification of a number of youngsters. However, there is no reason why this variable should have operated selectively; there may have been misclassification at the middle SES level as well. The relatively large size of the sample employed was intended to limit the extent to which these problems contributed to the results.

In order to examine the hypothesized advantages of programed instruction for poor youngsters, a more elaborate study is obviously required. Thus, at the minimum, it would certainly be desirable to have non-programed materials represented and administered to both groups. The present data suggests, however, that future research might more profitably devote attention to the interaction of a number of variables with class membership and achievement, such as that by Filep (1967), and/or a number of individual difference variables as suggested by Ausubel (1967), rather than relying on SES by itself. Present results argue loudly that SES level by itself is unlikely to account for a substantial percentage of achievement variance.

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